

### **Remarks**

Applicants have read and considered the Office Action dated January 26, 2004 and the references cited therein. Claims 1, 2, 9, 16, 26, 27, 31, 32, 39 and 40 have now been amended. Claims 22-25 and 33-34 have been canceled. Claims 1-21, 26-32 and 35-41 are currently pending.

In the Action, the rejection of claims 1, 5, 9-13, 26, 30-32 and 35-41 under 35 U.S.C. § 102(b) as being anticipated by Stacey et al was maintained. In light of the arguments in Applicants' previous response, the Examiner argues that Stacey clearly teaches the application of LCO to the roots of legume plants and references column 2, lines 44-46 in claim 1. The Examiner further argues that Stacey teaches the application of LCO to legume seedlings and references column 4, lines 61-67. The Examiner maintains that said enhancements are inherent since, "the prior art and instant invention teach the same active step of applying LCO to legume seeds or roots. With respect to the incubation of bacterial strains expressing an LCO, the Examiner argues that Stacey teaches the Rhizobium releases LCO in the vicinity of legume roots." Therefore, the Examiner asserts that it is inherent that the release to roots would produce said enhancement.

Claims 1, 9, 26, 31, 32, 39 and 40 have now been amended and recite seed germination and seedling emergence. The claims do not recite plant growth. Applicants therefore assert that the claims patentably distinguish over the Stacey et al. reference. Stacey neither teaches nor suggests a method for enhancing seed germination and seedling emergence. The Examiner only asserts that Stacey promotes plant growth. Applicants assert that the methods now recited in the present invention are not the same methods as taught in Stacey et al. Moreover, the types of treatment are substantially different and would not be obvious to one of ordinary skill in the art to apply a method utilized to promote plant growth for seed germination and seedling emergence. The processes occur at different times and different circumstances. One of ordinary skill in the art would not be led by Stacey to utilize the presently recited methods.

Stacey fails to teach or suggest the application of LCO to seeds of legumes or non-legumes for the purpose of acceleration of seed germination or seedling emergence. Upon a

Careful reading of Stacey et al., one of ordinary skill in the art would understand the teaching of Stacey et al. to be limited to the application of LCO to plant roots. As stated at column 1, line 60-63 of Stacey: "It is desirable to have a means for inducing nodulation on the **roots** of leguminous plants that is independent of the presence of rhizobial bacteria." (emphasis added) Stacey et al. further states at column 1, line 66 to column 2, line 1: "The present inventors have discovered and purified a phytohormone which is capable of inducing **root** hair curling and **root** nodulation in the **roots** of leguminous plants." (emphasis added) Moreover, Stacey states that the invention is directed to treating the root of the plant. See column 2, lines 33-39, which states: "In accordance with the method of the present invention root hair curling and **root** nodulation of the **roots** of leguminous plants are induced. The method comprises treating the **roots** of the plant with a pentasaccharide phytohormone..." (emphasis added) Although it is asserted that Stacey treats legume "seedlings", one of ordinary skill in the art readily appreciates that this is different from the application to seeds at the germination or emergent stages. The procedure described beginning at column 4, line 53 to column 5, line 55 does not describe the treatment of seeds. Moreover, nowhere does Stacey et al. teach the treatment of seeds to enhance seed germination or seedling emergence. Stacey et al. relates only to "the root hairs of the seedlings". The treatment of Stacey et al. occurs on plant roots and such treatment is observed marked deformations and swelling of the root hairs, including nodulation. This is again stated at column 5, lines 51-55.

The treatment and the effect of the treatment taught by Stacey et al. are very different from the treatment and its effect as taught in the present application in relation to seed germination and seedling emergence. According to the present invention, the application of LCO's to accelerate seed germination and seedling emergence by a more rapid emergence of radicals. By definition, one of ordinary skill in the art would understand this to mean an embryonic root that is not yet fully formed does not yet hold the structures associated with a mature root, such as root hairs. In contrast, the treatment and effects as taught by Stacey et al. relate to treatment of LCO and plant roots causing curling and the formation of nodulation primordial. The two methods occur at very different stages of development and Stacey involves a treatment where LCO with nodules are formed and begin to supply nitrogen to the plant

providing a first opportunity for improved plant growth from LCO release as part of the nitrogen-fixation symbiosis. Therefore, the present invention and Stacey et al. address methods at very different physiological development stages.

Applicants have attached a summary of the differences between the Stacey et al. patent and the method of the present invention. The illustrations and explanatory text clearly differentiate the two methods.

As Stacey et al. fails to teach the methods as recited in the presently submitted claims, Applicants assert that the rejection under 35 U.S.C. § 102(b) is traversed.


Claims 6-8 and 14-16 were rejected under 35 U.S.C. § 103(a) as being obvious over Stacey et al. Applicants assert that the presently submitted claims clearly recite a method that patentably distinguishes over Stacey. For the reasons stated above regarding anticipation by Stacey, Applicants assert that the obviousness rejection over Stacey is also traversed.

Applicants assert that the claims are in condition for allowance. A speedy and favorable action on the merits is hereby solicited. If the Examiner feels that a telephone interview may be helpful in this matter, please contact Applicants' representative at (612) 336-4728.

Respectfully submitted,

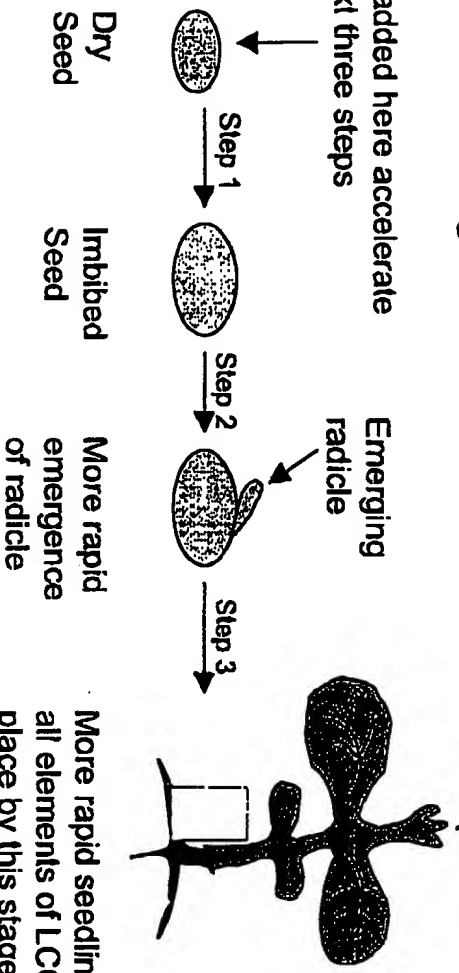
MERCHANT & GOULD P.C.

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## 1. Effects following external LCO addition to seeds (Smith et al. patent):

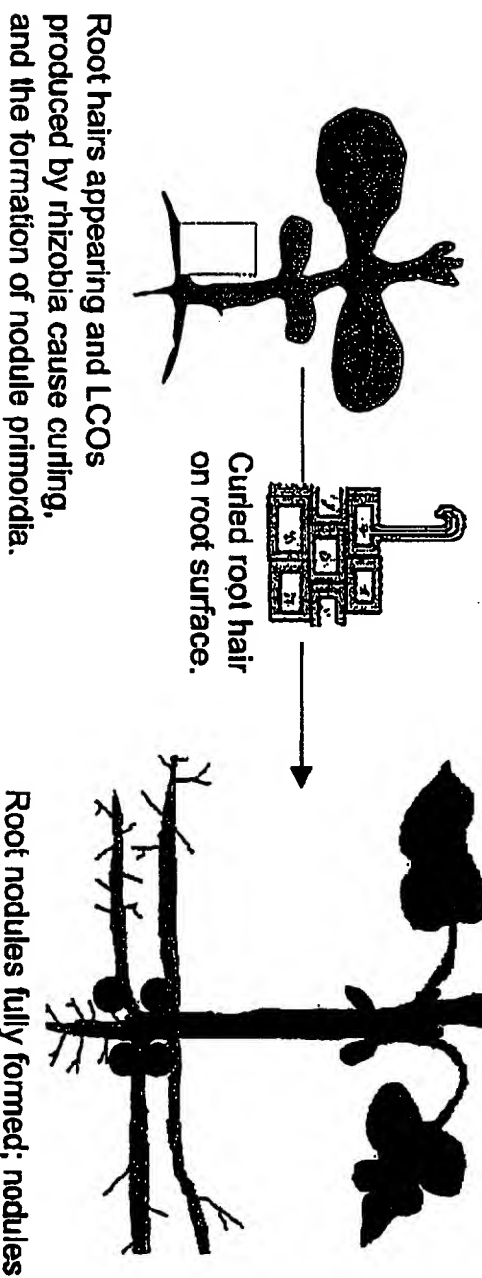
LCOs added here accelerate the next three steps



Definition – radicle is an embryonic root; it is not yet fully formed and does not yet hold the structures associated with a mature root, for instance, root hairs.

More rapid seedling emergence; all elements of LCO effects in place by this stage of development. About 10 days in a greenhouse.

## 2. Effects following release of LCOs from rhizobial cells on roots (Stacey patent):



Root nodules fully formed; nodules begin to supply nitrogen to the plant, providing the first opportunity for improved growth from LCOs released as part of the N fixation symbiosis. About 20 days in a greenhouse.